

Logging Practices

Play+ Logging Helper : playlog Introduction ■ In the Play+ ecosystem, we believe developer tools should be invisible until needed—frictionless by default, powerful when required. This helper is based on the concept of structured, environment-aware logging. Effective logging is crucial for observability, debugging, and understanding user behavior. The playlog helper provides a zero-setup, unified API for capturing application events. This aligns with our core design pillars by making development more Intuitive (a simple API abstracts complexity), our systems more Adaptive (clear logs help us respond to issues faster), and our codebase more Distinct (a consistent logging approach across all projects). Package Info ■ The Play+ logging helper is provided via the @playplus/logging package and is included by default in the Golden Path starter kit. Description ■ Package / Path Golden Path (Recommended) Pre-installed /system/play.log.ts Uplift Path npm install @playplus/logging Folder Reference ■ The logging helper and its configuration follow our standardized folder structure for core system logic. File / Directory Purpose & Guidelines system/play.log.ts The core logging service. It abstracts the underlying logging library (e.g., Pino) and handles all formatting. config/play.log.config.json User-overridable configuration for log levels, PII redaction, and log transport (where logs are sent). .env Environment-specific variables, which can override settings in the config file. Helper - Pillars Alignment ■ The playlog helper is a foundational tool that reinforces our core design pillars. Pillar How This Helper Aligns Intuitive Primary Pillar: Replaces the complexity of logging libraries with a simple, memorable API (info , warn , error). Adaptive Automatically adjusts its output and transport based on the environment (e.g., pretty-prints in dev, sends JSON in prod). Distinct Ensures a consistent structure and format for all log outputs across all Play+ applications, creating a unified signal. Helper Overview ■ The playlog helper is your single, unified interface for all application logging. Its purpose is to abstract the plumbing of a production-grade logging system. Developers don't need to worry about log formatting, timestamps, redaction, or routing; they just need to call the appropriate method. Behind the scenes, the helper automates everything: Structured Formatting : In production, it formats logs as JSON, ready for ingestion by services like Datadog or Sentry. Pretty Printing : In development, it formats logs in a human-readable, colorized way. Automatic Enrichment : It automatically injects context like timestamps, hostname, and application name into every log entry. PII Redaction : It automatically

scrubs sensitive data (like passwords and tokens) based on your configuration, before the log is ever written. Environment-Aware Transport : It logs to the console in development but can be configured to send logs to a remote service in production. This means a developer can simply call `playlog.info()` and trust that the system is doing the right thing for the current environment. Config Options ■ Global configuration is managed in `config/play.log.config.json` and can be overridden by environment variables. Configuration Priority ■ The `playlog` helper determines the active log level using the following priority order: Environment Variable : Highest priority. A variable like `LOG_LEVEL=debug` in your `.env` file or CI/CD environment will always take precedence. This is ideal for temporary debugging. `play.log.config.json` file : The project-wide default setting. This is the recommended place to set the standard for your environments. Built-in Default : If neither of the above is set, the helper falls back to its own internal default, which is "info". Configuration Details ■ Config Variable Default Value Description Recommended Value level "info" The minimum level to log. In order of verbosity: `debug` , `info` , `warn` , `error` . Can be overridden by `LOG_LEVEL` env var. "debug" in dev, "info" in prod redact `["password", "token", "authorization"]` An array of object keys whose values will be masked (e.g., `[REDACTED]`). Uses partial matching. Add any custom PII keys transport.type "console" Where to send logs. "console" for `stdout`, "remote" to send to a URL. "remote" in production transport.apiUrl null If type is "remote" , this is the endpoint where logs will be sent via a POST request. Your log ingestion URL transport.apiKey null An optional API key to be sent in the Authorization header for remote transport. Use environment variables. Your logging service API key Helper Methods ■ Recommended Methods ■ For clarity, readability, and best practice, we recommend using these level-specific methods. They make your intent clear and allow for easy filtering in logging platforms. Method Name What It Does Method Signature `debug` Logs a verbose message, useful for development and deep debugging. Hidden in production by default. `debug(message: string, context?: object): void` `info` Logs an informational message, such as a user action or system event. `info(message: string, context?: object): void` `warn` Logs a warning about a potential issue that doesn't prevent the application from working. `warn(message: string, context?: object): void` `error` Logs an error, typically with an `Error` object to capture its stack trace and other details. `error(error: Error, message?: string, context?: object): void` Universal Method ■ The `add` method provides a flexible, "one-call-to-log-them-all" interface. It intelligently determines the log level based on the arguments provided. While powerful, the level-specific methods above are preferred for readability. Method Name What It Does

Method Signature add A universal logging method that handles simple messages, contextual logs, and errors intelligently.

```
add(messageOrError: string | Error, context?: object, message?: string): void
```

React: Component Lifecycle and User Interaction ■ // features/billing/SubscriptionButton.tsx import React from "react" ; import { playlog } from "../../../system/play.log" ; import { apiService } from "../../../system/api/apiService" ; function SubscriptionButton ({ planId , userId }) { const handleClick = async () => { playlog . info ("Subscription button clicked" , { planId , userId }) ; try { await apiService . post ("/subscribe" , { planId }) ; playlog . info ("Subscription successful" , { planId , userId }) ; } catch (err) { // Log the actual error object to get a stack trace playlog . error (err , "Subscription API call failed" , { planId }) ; // The universal 'add' method can also be used for errors: // playlog.add(err, { planId }, 'Subscription API call failed'); } } ; React . useEffect (() => { playlog . debug ("SubscriptionButton component mounted" , { planId }) ; } , [planId]) ; return < button onClick = { handleClick } > Subscribe </ button > ; }

Angular: Service-Level Logging ■ // core/auth.service.ts import { Injectable } from '@angular/core' ; import { playlog } from '@playplus/core' ; // Assuming helper is available import { User } from '../models/user.model' ; @ Injectable ({ providedIn : 'root' }) export class AuthService { login (credentials : any) : void { const userId = credentials . id ; playlog . info ('Login attempt started' , { userId }) ; // ... authentication logic ... if (/* login fails */) { const authError = new Error ('Authentication failed: Invalid credentials') ; // Log the error object for a full trace playlog . error (authError , 'User authentication failed' , { userId }) ; return ; } playlog . info ('Login successful' , { userId }) ; } }

Additional Info ■ Why We Created This Helper ■ Without a centralized logging helper, developers often default to using console.log , which has major drawbacks: it's unstructured, has no severity levels, cannot be configured for different environments, and reveals sensitive information in production. Setting up a proper logging library like Pino or Winston from scratch is complex and requires significant boilerplate. The playlog helper solves this by providing a production-ready logging system out of the box. It abstracts away all the configuration and formatting, allowing developers to add meaningful, secure, and structured logs with a single line of code.

Best Practices ■ Log What, Not How : Log significant events ("User created") rather than implementation details ("Function createUser was called").

Log at the Right Level : Use error for actual errors, warn for potential issues, info for key events, and debug for temporary development tracing.

Always Provide Context : A log message like "API failed" is useless. "API failed", { endpoint: '/users', status: 500 } is invaluable.

Pass Full Error Objects : Always log the actual Error object in playlog.error() to automatically

capture stack traces. Don't Log PII : Trust the redaction system, but avoid logging sensitive data in the first place where possible. Developer Checklist ■ Is my log message clear and concise? Have I included relevant context (like a userId or requestId)? Am I using the correct log level (info , warn , error)? For errors, am I passing the Error object to playlog.error() ? Have I double-checked that I'm not logging any sensitive information that isn't covered by the global redaction config?

```
// features/billing/SubscriptionButton.tsx
import React from "react";
import { playlog } from "../../system/play.log";
import { apiService } from "../../system/api/apiService";

function SubscriptionButton({ planId, userId }) {
  const handleClick = async () => {
    playlog.info("Subscription button clicked", { planId, userId });

    try {
      await apiService.post("/subscribe", { planId });
      playlog.info("Subscription successful", { planId, userId });
    } catch (err) {
      // Log the actual error object to get a stack trace
      playlog.error(err, "Subscription API call failed", { planId });
      // The universal 'add' method can also be used for errors:
      // playlog.add(err, { planId }, 'Subscription API call failed');
    }
  };
}

React.useEffect(() => {
  playlog.debug("SubscriptionButton component mounted", { planId });
}, [planId]);

return <button onClick={handleClick}>Subscribe</button>;
}
```

```
// core/auth.service.ts
import { Injectable } from '@angular/core';
import { playlog } from '@playplus/core'; // Assuming helper is available
import { User } from '../models/user.model';

@Injectable({ providedIn: 'root' })
export class AuthService {
  login(credentials: any): void {
    const userId = credentials.id;
    playlog.info('Login attempt started', { userId });

    // ... authentication logic ...
  }
}
```

```
if /* login fails */ {
    const authError = new Error('Authentication failed: Invalid credentials');
    // Log the error object for a full trace
    playlog.error(authError, 'User authentication failed', { userId });
    return;
}

playlog.info('Login successful', { userId });
}
}
```